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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/857,116	08/09/2001	Peter Geoffrey Gray	JMYT-245US	9674
23122	7590	12/14/2004	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			DUONG, THANH P	
			ART UNIT	PAPER NUMBER
			1764	
DATE MAILED: 12/14/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/857,116

Applicant(s)

GRAY ET AL.

Examiner

Tom P Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

Applicants' remarks and amendments filed on September 20, 2004 have been carefully considered. Claims 1, 7, and 11 have been amended. Claims 12-14 have been canceled. Claims 1-11 are pending in this application.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Trocciola et al. (5,330,727).

Regarding claims 1 and 8, Trocciola et al. discloses a catalytic selective oxidation reactor, comprising a cylindrical reactor vessel (10) with counter-current cooling means (25, 35) and at least one stage (first stage 20, second stage 30), each stage being provided with an inlet for a first feedstock (11), and inlet for a second feedstock (O<sub>2</sub>/Air), gas mixing means (23, 33) and a catalytic reaction zone (22,32), wherein the reaction zone comprises a selective catalyst (22,32) deposited upon a metal support (23,33), wherein the selective oxidation catalyst comprises of a platinum group metal carried on a high surface area metal oxide support (Col. 5, lines 8-10), wherein the reaction zone

is generally annular in shape (catalyst beds 22 and 23 annularly surround the cooling coil 24 or 34), and wherein the counter current cooling means (coils 24 and 34) comprises at least one of an internal liquid cooling (coil inside beds) and an external liquid cooling (conduit 25 or 35). With respect to the process of "coating" the catalyst on a metal support, Trocciola does not disclose such process; however, such limitation is a product-by-process limitation, and product-by-process claim is the same or obvious from a product of the prior art, the claim is unpatentable even through the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trocciola et al. '727 in view of Aoyama (5,843,195) and Madgavkar et al. (4,186,801). Regarding claims 1 and 8, Trocciola et al. discloses a catalytic selective oxidation reactor, comprising a cylindrical reactor vessel (10) with counter-current cooling means (25, 35) and at least one stage (first stage 20, second stage 30), each stage being provided with an inlet for a first feedstock (11), and inlet for a second feedstock (O<sub>2</sub>/Air),

gas mixing means (23, 33) and a catalytic reaction zone (22,32), wherein the reaction zone comprises a selective catalyst (22,32) deposited upon a metal support (23,33), wherein the selective oxidation catalyst comprises of a platinum group metal carried on a high surface area metal oxide support (Col. 5, lines 8-10), wherein the reaction zone is generally annular in shape (catalyst beds 22 and 23 annularly surround the cooling coil 24 or 34), and wherein the counter current cooling means (coils 24 and 34) comprises at least one of an internal liquid cooling (coil inside beds) and an external liquid cooling (conduit 25 or 35). Trocciola does not disclose the selective oxidation catalyst is coated on a metal support. Aoyama teaches the selective oxidation catalyst (platinum) solution is absorbed onto the catalyst support alumina to form effective oxidation catalyst (Col. 11, lines 8-32). Likewise, Madgavkar teaches the coating of catalyst on the metal support permits the passage of the gas with little pressure pressure drop. Thus, it would have been obvious in view of Aoyama and/or Madgavkar to one having ordinary skill in the art to modify the selective oxidation catalyst of Trocciola with the catalyst made by the process as taught by Aoyama and/or Madgavkar in order to provide an effective catalyst and a catalyst support with less pressure drop.

3. Claims 1-2, 4-5, and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2,075, 859 (GB '859) in view of Trocciola '727 and Heisel (4,988,431) and Cook (5,113,844). Regarding claims 1 and 8-9, GB '859 discloses a catalytic selective oxidation reactor, comprising a cylindrical reactor vessel (Fig. 2) with

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cooling means (via water downcomer 36) and at least one stage (Page 4, lines 7-10), each stage being provided with gas inlets (22) for a first feedstock, gas mixing means (vertical fins, Col. 4, lines 28-30) and a catalytic reaction zone (24) generally annular in shape. GB '859 fails to disclose an inlet for a second feedstock. Trocciola '727 teaches the second feedstock (oxygen/air) is feed to the catalyst beds 22 and 32 to facilitate the oxidation reaction (Col. 5, lines 11-20). Thus, it would have been obvious in view of Trocciola to one having ordinary skill in the art to modify the catalytic reactor of GB '859 with an inlet for a second feedstock as taught by Trocciola in order to facilitate the oxidation reaction. GB '859 does not disclose the selective oxidation catalyst is coated on a metal support. Aoyama teaches the selective oxidation catalyst (platinum) solution is absorbed onto the catalyst support alumina to form effective oxidation catalyst (Col. 11, lines 8-32). Likewise, Madgavkar teaches the coating of catalyst on the metal support permits the passage of the gas with little pressure drop. Thus, it would have been obvious in view of Aoyama and/or Madgavkar to one having ordinary skill in the art to modify the selective oxidation catalyst of Trocciola with the catalyst made by the process as taught by Aoyama and/or Madgavkar in order to provide an effective catalyst and a catalyst support with less pressure drop. GB '859 fails to disclose "counter-current" cooling means. Heisel teaches the heat released from the exothermic reaction is removed by a heat exchange coils 18 with counter current flow. Cook makes it clear the heat exchange with counter-current flow is more efficient than heat exchange with co-current flow (Col. 1, lines 18-31). Thus, it would have been obvious in view of Heisel and Cook to one having ordinary skill in the art to modify the

reactor of GB '859 with heat exchange having counter-current means as taught by Heisel and Cook in order to improve efficient of the heat exchanger. Regarding claims 1 and 2, GB '859 shows the metal support (25) is mounted in heat exchange contact with cooling means (36, 38). Regarding claim 4, GB '859 shows the cooling means comprises a central jacket (36,38) mounted within a reactor (Fig. 2). Regarding claim 5, GB '859 shows the central jacket (45A) is connected to the coolant (via line thru boiler feed water) to an external heat exchanger (47). Regarding claim 7, GB '859 shows the catalytic reaction zones (24) are annular and surround the cooling means (36,38). Regarding claim 10, GB '859 discloses the gas mixing means comprises annular mixing vanes or discs (vertical fins, Col. 3, lines 25-34), which facilitates mixing of the gases and transfers gases from one stage to subsequent stage.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (GB '859 in view of Trocciola '727 and Heisel '431 and Cook '844) as applied in claim 1 above and further in view Madgavkar et al. (4,186,801). GB '859 discloses the metal support (catalyst grids 25) but the applied references fails to disclose the metal support is a "metal monolith." Madgavkar teaches oxidation catalyst is carried on by an inert support structure such as a honeycomb monolith carrier and such structure provides the benefits of supporting the catalyst and minimizes the pressure drop across the bed (Col. 5, lines 35-54). Thus, it would have been obvious in view of Madgavkar to one having ordinary skill in the art to modify the catalytic reactor of the applied

references with a catalyst of honeycomb monolith carrier as taught by Madgavkar in order to gain the above benefits.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (GB '859 in view Trocciola '727 and Heisel '431 and Cook '844) as applied in claim 4 above and further in view Fleckenstein et al. (4,942,266). Regarding claim 6, GB '859 shows a central jacket connected to a cooling circuit to an external heat exchanger but fails to show a circulation pump. Fleckenstein teaches a pump 15 is arranged in the coolant circuit 13 and such pump facilitates the transferring of coolant from the heat exchanger to the reactor. Thus, it would have been obvious in view of Fleckenstein to one having ordinary skill in the art to modify the cooling circuit of applied references with a circulation pump as taught by Fleckenstein in order to facilitate the transferring of the coolant from heat exchanger to the reactor so that the reaction temperature in the catalyst bed can be controlled properly.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (GB '859 in view of Trocciola '727 and Heisel '431 and Cook '844) as applied in claim 1 above and further in view Aoyama (5,843,195). The applied references fail to disclose the output from a reformer such that CO is removed from the output gas to a level where the output from the reactor may be fed to a fuel cell. Aoyama teaches the output reforming gas from the reformer 30 (Fig. 1) is fed to the CO selective oxidizing unit 34 to reduce the CO concentration and the reforming fuel (rich-hydrogen) is fed to



the fuel cells 20 (Col. 9, lines 57-62) to provide electrical energy. Thus, it would have been obvious in view of Aoyama to one having ordinary skill in the art to modify the catalytic reactor of the applied references with a reformer connected upstream of the catalytic reactor to convert hydrocarbon gas to reforming gas to be used in the fuel cell.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong  
December 1, 2004

TD

  
Glenn Caldarola  
Supervisory Patent Examiner  
Technology Center 1700